

Homework 3

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1 Problem : Page 113: 2

The following table gives the elongation e in inches (in./in.) for a given stress S on a steel wire measured in pounds per square inch (lb/in.²). Test the models $e = c_1 S$ by plotting the data. Estimate c_1 graphically.

Table 1:

$S(x10^{-3})$	5	10	20	30	40	50	60	70	80	90	100
$e(x10^5)$	0	19	57	94	134	173	216	256	297	343	390

2 Problem : Page 121: 2.a

For each of the following data sets, formulate the mathematical model that minimizes the largest deviation between the data and the line $y = ax + b$. If a computer is available solve for the estimates of a and b .

Table 2:

x	1	2.3	3.7	4.2	6.1	7.0
y	3.6	3.0	3.2	5.1	5.3	6.8

3 Problem : Page 127: 10

Data For planets

Body	Period (sec)	Distance from sun (m)
Mercury	7.60×10^6	5.79×10^{10}
Venus	1.94×10^7	1.08×10^{11}
Earth	3.16×10^7	1.5×10^{11}
Mars	5.94×10^7	2.28×10^{11}
Jupiter	3.74×10^8	7.79×10^{11}
Saturn	9.35×10^8	1.43×10^{12}
Uranus	2.64×10^9	2.87×10^{12}
Neptune	5.22×10^9	4.5×10^{12}

4 Problem : Page 136: 7

- a. In the following data, W represents the weight of a fish (bass) and l represents its length. Fit the model $W = kl^3$ to the data using the least-squares criterion.

Table 3:

Length, l (in.)	14.5	2.3	3.7	4.2	6.1	7.0
Weight, W (oz)	3.6	3.0	3.2	5.1	5.3	6.8

5 Problem : Page 146: 5

Solve Problems 1 - 4 with the model $V = m(\log P) + b$. Compare the errors with those computed in Problem 4. Compare the two models. Which is better?

6 Problem : Page 157: 4

7 Problem : Page 169: 11

8 Problem : Page 181: 5